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A Sneak Preview
of IIGS Software
Pg. 60

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**"IT'S
AMAZING!"**

STEVE WOZNIAK
Apple II Creator

- ▶ SPEED
- ▶ COLOR
- ▶ SOUND
- ▶ COMPATIBILITY

The New
IIGS



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The New
IIgs

BACK TO THE **FUTURE:** APPLE'S AMAZING GS

by Eric Grevstad, *inCider* staff

The sensational Apple IIgs boasts something old and something new: compatibility with thousands of existing Apple II software packages, plus vibrant graphics, superb sound, and the Mac interface.

It's got expansion slots like the IIe, built-in interface ports like the IIc, and mouse-and-menu firmware like

To say that it's the most significant Apple II news in years is an understatement. It combines two of the most significant computers ever (the II and Mac), and represents a landmark commitment—dare we say recommitment?—to the market audience that made Apple a success. That audience has grown more sophisticated over the years, and Apple has responded with a II that's second to none in sophistication.

At first, the IIgs' role as a faster, more convenient II compatible will overshadow its gee-whiz abilities; *inCider's* preview in Cupertino came too early (June 11-12) to see the machine's new operating system, ProDOS 16, or any 16-bit, super-hi-res software except demos. Indeed, Apple's IIgs product manager Curtis Sasaki





Wozniak on the IIgs

Take it from one who knows his Apple II's: The new IIgs is "amazing."

So says Steve Wozniak, one of the founders of Apple Computer and the designer of the Apple II. Although Wozniak is no longer working full-time at Apple, he manages to keep up with new developments, especially of the Apple II variety. When *inCider* talked with him in June, he was anxiously awaiting delivery of his new Apple IIgs.

"It's a very good machine for people like myself—technicians—who need a computer right in the lab to develop hardware and software," he says. Wozniak plans to use the GS in engineering projects for his new company, CL-9, in Los Gatos, California. The extra speed a 16-bit processor offers is particularly attractive to him. "The higher speed gives me faster assembly-language code. I'll only have to wait eight seconds, as opposed to 40 seconds," he adds.

But Wozniak is also "very impressed" with the color and quality of graphics achieved by the GS: "One of the most impressive features is to see Mac-style graphics moving faster than on the Mac and in color." But the Mac-style interface goes beyond graphics and will bring the mouse-driven menu interface to all applications—Wozniak is excited about that. "I'm looking forward to getting a chance at mouse-based word processing on a II, in addition to painting and color," he says.

As for the sound, Wozniak predicts that enhancement will "have the most impact of all on education." Some applications that have been discussed include foreign-language lessons and training in musical instruments and composition.

In general, Wozniak is glad to see so many enhancements over the existing Apple II offered in one machine. "It's amazing to see so much done at once," he comments. And yet, at the same time, he's pleased to see that Apple has given some very serious thought to maintaining software compatibility with existing Apple II's: "I have hopes that it is very compatible and have reason to believe that it is very compatible."

Wozniak is so impressed with the new machine that he even predicts it will snare 50 percent of the installed Apple II user base in the next few years. And we can certainly count on him to be one of those IIgs users. □

—Deborah de Peyster

The IIgs system unit is half wedge and half rectangle, about the size of a IIe (counting its keyboard). Like older Apples, it serves as a stand for a composite monochrome or new hi-res analog RGB color monitor.

After what IIgs engineers say were lengthy debates about extra cost and classroom reliability, the Apple team decided on a detached keyboard. The 80-key, low-profile board contains the familiar IIe or IIc layout with two notable exceptions. One is a numeric keypad with its own clear and enter (return) keys.

The other is the solid-apple key—renamed the option key and moved just to the left of the open-apple (which also bears the Mac's cloverleaf command-key symbol). The bottom row of the keyboard, from left to right, contains caps lock, option (solid-apple), open-apple, single left quote (tilde), space bar, backslash (vertical bar), and then the four arrow keys. The reset button is centered above the top row.

Minor layout differences aside, the keyboard passed *inCider's* typing tests with flying colors—a bit firmer than a IIe board, but not as shallow or stiff as a IIc's. There are connectors for the IIgs' Apple Desktop Bus input port on both the left and right sides of the keyboard; whichever you don't use for the keyboard, depending on whether you're left- or right-handed, fits the IIgs' standard mouse.

16 Bits, No Waiting

Under the hood, the IIgs bears a family resemblance to the IIe: There's a 60-watt power supply on the left, seven expansion slots along the rear of the motherboard, a dedicated eighth slot, and even some familiar antiques like the Apple II game I/O (input/output) socket. There's no cooling fan, though Sasaki says the company recommends and will sell one to users who fill three or more slots; it will fit inside the case, under the power-supply box.

At second glance, though, the IIgs is clearly a brand-new animal. For one thing, the 6502 microprocessor has finally retired. The new Apple is built around the 16-bit 65C816 (or 65SC816, to read the GTE chip in one of the units we saw), which runs at either the familiar 1 MHz or a fast 2.8 MHz clock rate. (Apple technical documentation confesses that housekeeping chores reduce speed to an effective 2.5 MHz, except for system programs running in ROM.)

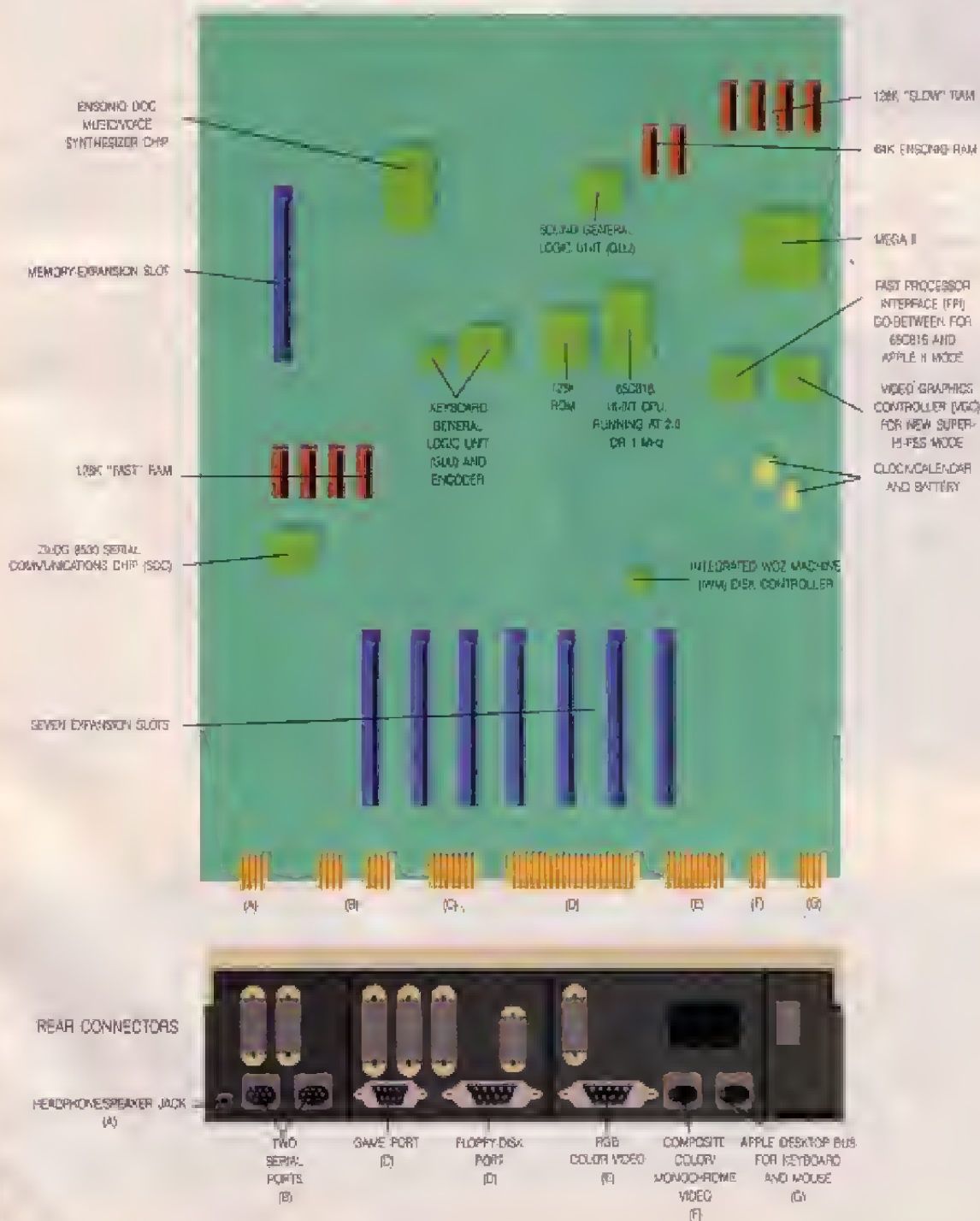
The 65C816 is a split-personality CPU. In emulation mode, it works exactly like the 8-bit 65C02, answering to the same instructions, running the same software (though with a choice of two speeds), and limited to the same 64K of memory at any one time. In native mode, it's a true 16-bit chip, not bottlenecked by an 8-bit address bus like the IBM PC's Intel 8088; in fact, its 24-bit bus can address up to 16 megabytes of memory simultaneously, with no bank-switching shenanigans. Sixteen megabytes is twice the maximum currently planned for the IIgs, or at least twice what's been said publicly.

Memory Matters

The IIgs comes with 256K of memory, arranged on the motherboard in two sets of four 256K-bit chips. When running Apple II programs, one 128K set, with slightly slower access than its companion, is reserved for display, I/O, and system memory, while the faster RAM becomes two 64K banks for program use. New IIgs programs fit mostly into fast RAM, but can spill over into the slower space; Apple technical papers say that roughly 176K of the standard 256K will be available for 16-bit programs.

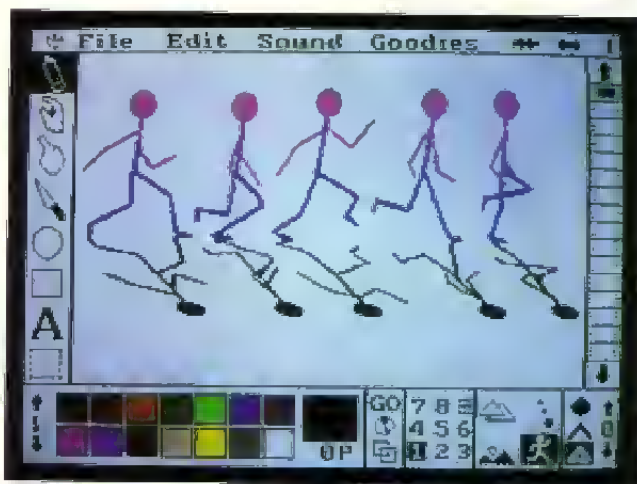
Figure. Diagram of sample IIGS motherboard and rear panel. Since the IIGS prototypes InCider saw in Cupertino were three months shy of being production models, Apple representatives wouldn't allow topless photos of the machines showing the interior logic board, or motherboard. However, they were too polite (though visibly uneasy) to prevent an InCider editor from drawing a freehand sketch of a sample board. This stylized diagram isn't guaranteed to accurately re-

fect final hardware, but shows some of the IIGS' main components and their positions relative to each other in the machines we saw. One thing the diagram can't convey is the flat profile yielded by Apple's use of newer surface-mounted instead of socketed technology. Except for the socketed CPU, RAM, ROM, and graphics controller, the IIGS' chips are efficiently mounted almost flush with the board.





Broderbund Software's *The Drawing Table* (above) and *Fantavision* (below) take advantage of the Gs' graphics capabilities.



To surpass 256K, there's the IIGs' eighth slot—not equivalent to the IIe auxiliary slot, but dedicated to memory expansion. This slot can carry up to 8 megabytes of RAM; according to Sasaki, Apple's own memory-slot card will stop at 1 megabyte, but third parties are expected to release 4- and 8-megabyte cards. The memory-expansion slot can also hold up to 1 megabyte of ROM, serving as an application ROM disk or adding extra convenience (an operating system, perhaps) to the standard 128K of ROM.

Does this mean current IIe memory-card owners are out of luck? Partially. Auxiliary-slot cards such as Applied Engineering's RamWorks are useful only as sources of chips to plug into the socketed new board, but a peripheral-slot card such as Apple's IIe expander will fit into one of the IIGs' seven expansion slots and will be recognized as a RAM disk.

The IIGs has a built-in real-time clock, powered by a lithium battery providing five to ten years' use (and soldered to the motherboard, upsetting *inCider's* consumer advocates, who think changing the battery in 1996 shouldn't require a trip to your dealer). The clock serves to time- and date-stamp disk files, though it uses different commands from those of current third-party timers such as the Thunderclock.

II Compatibility: From El Grando to Mega II

Computers today commonly use VLSI (very large-scale integrated) circuits, but the new Apple carries the technology to extremes. The first four IIGs prototypes, dubbed "El Grandos" by the engineering team, were computers the size of conference tables, lashed together from old-fashioned wire-wrapped circuit boards with hundreds of IC's each. Once the design was debugged, it could be shrunk. Along the way, the Apple II—the whole computer, except for the processor and memory—was squeezed onto a single chip. It's called the Mega II, and it's the heart of the IIGs' compatibility with ProDOS, DOS 3.3, and Pascal 1.3 software. (Yes, WordStar and Studebaker lovers, Apple says the IIGs will run CP/M software with one of today's Z-80 cards, though some cards require a software patch.)

The Mega II encompasses the IIe's MMU (memory-management unit), IOU (input/output unit), general-logic unit, timing generator, and character-generator ROM's (for upper- and lowercase and mousetext, with Swedish, German, Italian, Spanish, Danish, French, and U.K. as well as U.S. English). It also provides II-compatible composite and RGB video, including low-, hi-, and double hi-res graphics.

The Apple IIGs: Fast Facts

- The new Apple has a 16-bit (65C816) processor and 256K of memory, expandable to 8MB. It uses two operating systems: ProDOS 16, supporting a Macintosh-style Finder for new 16-bit software, and ProDOS 8 for Apple II emulation. One of its custom chips, the Mega II, is a complete IIe except for the CPU and memory.
- Except for communications programs, the IIGs will boot and run nearly all existing ProDOS, DOS 3.3, and Pascal 1.3 software. You can temporarily leave a program to use a firmware Control Panel—changing options such as screen colors or switching between the traditional 1 MHz and a swift 2.8 MHz clock speed.

- New programs can take advantage of two super-hi-res modes, with bit-mapped graphics in 320-by-200 (256 colors on screen) or 640-by-200 (64 colors) resolution.
- The IIGs' sound capacity matches a music synthesizer's, with a digital oscillator chip supplying 15 voices or instruments. With proper software and I/O hardware, it can sample (record) and play back music or speech.
- There are seven expansion slots plus a dedicated RAM/ROM memory-expansion slot, as well as an array of built-in interfaces (disk drive, composite and analog RGB video, and two serial ports including AppleTalk network firmware). A mouse is standard equipment, as is a keyboard with numeric keypad. □

Another new chip, the FPI (fast processor interface), is the link between the old and new architecture, controlling 65C816 access to the Mega II and Mega II access to the faster RAM. Together, they ensure that the IIGs will boot and run practically anything your II Plus, IIe, or IIc can—in the case of *inCider's* trip to Apple headquarters, everything in a box of office disks ranging from AppleWorks, Mouse Desk, and SuperCalc3a to F-15 Strike Eagle and Stickybear Speltgrabber. One IIGs hung up after the title screen of Epyx' Ballblazer; another, with newer ROM's, ran the game successfully.

The major exceptions are communications programs, most of which (even Apple's own Access II) bypass formal I/O channels to directly address the II's serial hardware. Since the IIGs has a different communications chip (see below), Apple expects vendors to issue revised versions of their programs, as it's doing for Access.

You're in Control

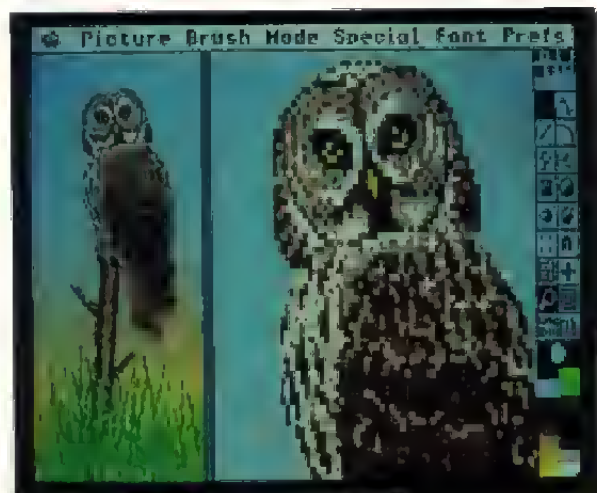
Users of self-booting software, as always, won't have to think about operating systems. New 8-bit (6502 emulation mode) programs will run under one of the IIGs' two operating systems, ProDOS 8, which doesn't look very different from the current ProDOS 1.1.1. (Screens we saw booted to a "ProDOS 8 1.2" message.) ProDOS 8 becomes the official operating system for the IIe and IIc, as well. At startup, it automatically checks to see whether it's on a IIGs and should read the clock.

But even when running an old program in an old graphics mode, you're never far from the IIGs firmware. Press the control, open-apple, and escape keys (except under ProDOS 1.1.1, which disables Interrupts), and your program is temporarily frozen while a Macintosh-like Control Panel takes over the screen.

The 8-bit Control Panel is a 40- or 80-column text display, compared to the bit-mapped, mouse-driven dashboard that waits behind ProDOS 16 software. But it offers the same range of options, from setting serial-port parameters to setting the time and date, choosing a foreign character set and keyboard layout, controlling sound (such as error beep) pitch and volume, or sizing a RAM disk. Default choices are preserved in battery-backed memory until you change them again.

Speeding Up Software

You'll probably use two Control Panel choices more often than any other. One lets you choose among 16



Above and below are examples of Electronic Arts' Deluxe Paint program running on the Apple IIGs. The above illustration was designed by Richard Antaki. The illustration below is by Avril Harrison.



IIGs Specifications

Processor: 65C816 (16-bit CPU with 24-bit address out), Super II+ and 2.8 MHz clock speeds in both native (ProDOS 16) and 65C02 emulation (ProDOS 8, DOS 3.3, Pascal 1.3) modes

Memory: 256K of RAM expandable to 8.25MB, 128K of ROM expandable to 1.125MB

Graphics: Apple II compatible 40- and 80-column text, 16- and 256-color graphics modes Super II+ 320 by 200 pixels (256 on-screen colors) and 640 by 200 pixels (64 on-screen colors). Palette of 4096 colors

Sound: Ensoniq 15-voice music/speech synthesizer chip with 64K of dedicated RAM and 32 digital oscillators.

Expansion: Seven Apple II-compatible expansion slots, one dedicated RAM/ROM memory-expansion slot. Clock/calendar standard

Ports: Composite and analog RGB color video. Disk-drive port (daisy-chain up to four 3½-inch 800K or 5¼-inch 140K drives). Apple Desktop Bus for keyboard and mouse. Two serial ports for printer, modem, AppleTalk (network firmware built in). Game/joystick port. Sound port/headphone jack. □

colors for text, background, or border display—blue AppleWorks on a yellow background within a green frame, for example. The other lets you toggle between slow (1 MHz) and normal (2.8 MHz) speeds.

The faster speed is a barely controllable riot for graphics games ("Go, Stickybear, go!"), but will be the usual choice for applications. Our unofficial stopwatch tests yielded approximately double speed—a SuperCalc3a recalculation in 0.6 instead of 1.3 seconds, an AppleWorks word-processing search-and-replace in 15.5 seconds instead of 35.1. Sasaki claimed Apple's tests show a somewhat greater improvement, though he admitted that a //e with an accelerator card like Applied Engineering's TransWarp is still faster by 5 to 10 percent. (Our test times are for IIGs slow versus fast modes; the IIGs at 1 MHz was trivially slower than a regular //e, but differences were within the margin of stopwatch reflex error.)

Super Graphics

The following articles contain more detail about 65C816 native mode and ProDOS 16 software, though at press time we don't know as much as we'd like to. Suffice it to say that IIGs programs will work like Macintosh programs, with pull-down menus and point-and-click mouse control, and that the centerpiece of ProDOS 16 will be a Mac-style Finder that makes file copying, for example, as easy as

scan line and 64 colors on screen. Those colors, Sasaki admits, are technically shades achieved through dithering (mixing blue with white, for instance); the number of true simultaneous colors in 640 mode is more like 16.

Symphonic Sound

As for sound, an adjustable error beep is only the beginning. The IIGs has the same Ensoniq DOC (digital oscillator chip) found in that company's Mirage music synthesizer, with its own 64K of RAM to store and manipulate digitized waveform representations or samples. The synthesizer chip includes an analog-to-digital converter and 32 oscillators; since one serves as a clock and most applications will use two for each voice (loading and playing waveforms, respectively), that lets the IIGs play 15 voices or instruments at once.

While there's room for the IIGs' sound capabilities to grow—neither stereo output nor the popular MIDI (Musical Instrument Digital Interface) are standard, though both are likely add-on products—the Ensoniq chip is already reason enough to hook up an external speaker to the IIGs sound port. (The IIGs has the same built-in low-fidelity speaker as the //e.) With the proper software, for instance, the IIGs can be a string quartet or a 15-piece band—it sounds like a musical instrument, not like a computer imitating one.

According to software engineer Gus Andrade,



What you'll get when you open your IIgs package: a system unit, keyboard, mouse, 3½-inch system (ProDOS 16 and utilities) and tutorial disks, and Applesoft BASIC, system disk, owner's guide, and setup manuals.

drives. Single drives can be either existing UniDisks of either size or the new 3½- and 5¼-inch Apple drives scheduled for release at IIgs rollout. (They're platinum color, and the 3½-inch drive plugs into either a IIgs or a Macintosh.) If you want a fifth or sixth floppy, a pair of 5¼-inch disks will run off a controller card in slot 6.

As far as the 3½- versus 5¼-inch drive decision goes, Apple and its customers are in an awkward position. The smaller disks are faster, quieter, sturdier, and more spacious, and deserve to become the market standard; Apple supplies the IIgs tutorial, ProDOS 16, and Finder on two 3½-inch disks, and new 16-bit software will presumably appear in 800K format. On the other hand, the IIgs can run thousands of existing Apple II programs, and they're on 5¼-inch floppies. Current owners can use their old drives with their new machines, but will ultimately have to buy a 3½-inch drive if they haven't already. Novices, at least for a while, will almost have to buy one of each.

Apple's Macintosh Plus has a SCSI (Small Computer Systems Interface, pronounced "scuzzy") port, used primarily for fast transfer of hard-disk data, as standard equipment. This led market watchers to guess that the

IIgs would have one, and it does—on an optional card for the IIgs and IIe, not as standard. Along with the SCSI card, Apple announced a matching 20-megabyte hard drive. The Hard Disk 20SC takes up extra desk space (10 by 11 inches) beside the computer, but can load programs or data at the breathless rate of 1.25 megabytes per second, according to Apple press information.

Communications and Networking

So far, we've mentioned almost every port along the IIgs' rear panel, from composite and RGB video to the disk port and Apple Desktop Bus (which can take input devices such as graphics tablets as well as the keyboard and mouse). If you've been waiting in suspense all this time, there's a game/joystick port back there, too.

And there are two built-in IIc-style serial ports, which most buyers should use for the traditional connections to printer and modem. There are, however, two changes in the IIgs' communications architecture. One is that the machine uses the same Zilog 8530 SCC (Serial Communications Chip) as the Macintosh—that's why communications software that expects to find earlier models' 6551 ACIA's

Another AppleWorks

As reported in our September News Line (p. 14), a new AppleWorks will appear when the IIgs does, but it won't be a mouse-driven, Macintosh-style program. Instead, the ProDOS 8 upgrade of Apple's best-selling multifunction package (for the IIe and IIc as well as the IIgs) adds two evolutionary features: a mail-merge function for word processing form letters, and extra memory support similar to the AppleWorks patches supplied with current memory-expansion cards. In short, the new AppleWorks will have as standard some of the features now sold as third-party enhancements.

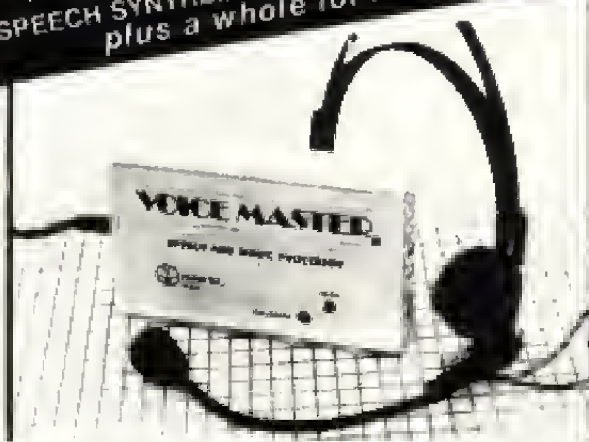
In a 128K system, the revised AppleWorks' 56K desktop is only 1K larger than version 1.3's; word-processor files are still limited to 2250 lines, data bases to 1350 records, and spreadsheets to 2K of data per row.

in a IIgs or a IIe or IIc with an Apple expander card, however, not only does the desktop grow (up to 1012K in 1-megabyte machines, as with AppleWorks 1.3), but so do allowable files: word processing to 7250 lines, data bases to 6350 records, and spreadsheets to 10K per row.

What about the 16-bit, mouse-and-menu version of AppleWorks? According to *inCider's* sources there might not be one. While today's AppleWorks will continue to be supported, Apple reportedly feels that the required rewrite would make little sense, considering the array of 65C816 software due from other developers. Possible candidates include Microsoft Works, the high-powered integrated package currently being prepared for the Macintosh. □

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(asynchronous communications interface adapters) won't work, as mentioned earlier. It's a matter of hardware compatibility; the IIGs firmware emulates the familiar Super Serial Card, as far as software commands are concerned.

The other difference is that printer and modem connections are only two of the IIGs' three communications abilities, any two of which you can use at a given time. The third is AppleTalk, protocol firmware for which is built into the IIGs just as into the Mac—a significant statement of Apple's plans for the new II in local-area networks, particularly since networking is an increasingly hot topic in educational-computing circles these days.

AppleTalk, announced in January 1985, is currently languishing as a system used primarily to connect multiple Macs to an office LaserWriter, as Apple still hasn't released the critical file-server component that will let networked computers share programs and data (if you want to ruin a friendship with an Apple official, say "AppleTalk file server"). But once complete, the network promises to be an affordable alternative to big corporate LAN's like 3Com's Ethernet, although its speed (230,000 bits per second) and size (300 meters maximum) are correspondingly less. If networking makes the transition to America's schools and small businesses, it'll be good to see the IIGs side by side with the Macintosh.

The Wish List

The IIGs doesn't have absolutely everything an Apple hacker could wish for, as project engineers confessed to us while our escort from Apple's public-relations staff blanched and sputtered. While the machine's 8-bit expansion slots provide compatibility with most Apple II add-ons, the designers considered adding 16-bit slots for more powerful peripherals. The video circuitry's place on the motherboard doesn't allow for quick upgrading as even more colorful, higher-resolution displays become feasible. The firmware Monitor includes new commands for the 65C816's extra functions, but Applesoft is boringly unchanged, with no support for the new graphics and sound (although ampersand routines may let programmers tap some of the toolbox firmware).

Also, while the IIGs is definitely inspired by the Macintosh interface, the Mac remains Apple's performance leader. It has a faster processor, higher resolution (albeit in black-and-white), and more ROM—instead of disk-based programming tools. The Mac's 68000 CPU also allows such conveniences as a switcher that supports multiple programs in memory at once, a feature Apple won't promise for the weaker 65C816.

On the other hand, Apple's Vice President for Product Development, Jean-Louis Gassée, told us, "We are already working on the successor to this machine. . . [and ensuring] that the software for [the IIGs] will run on it, even if we make hardware changes at the lowest level." When it comes to upward compatibility, Apple is clearly hanging on to its good habits.

Besides, for now the IIGs isn't meant to be Apple's top of the line. It's meant to revitalize the Apple II world—which it does with a vengeance, with fireworks, with choirs singing. No other microcomputer company has ever made a totally new machine that's hardware- and software-compatible with an old one; no other company has ever had such a large, loyal installed base to benefit from the maneuver. Seeing the sensational IIGs, you realize the slogan "Apple II Forever" was wasted on the IIc. ■

The New
IIGS



WHO WILL BUY THE IIGS?

"The reincarnation of the Apple II spirit": For education, home, and small business, the powerful, high-end IIGS combines open architecture with sophisticated graphics and sound.

by Dan Muse, *inCider* staff

What's platinum and goes between the Apple IIe and the Apple Macintosh? The answer: the new Apple IIGS. Its color is platinum, and its position in the Apple II product line is between the IIe and the Mac. Officially, Apple says, the GS is the high end of the Apple II family, and the company will market the machine for educational and home-business applications. Unofficially, the GS has no bounds, and you, the user, will decide where the GS fits in.

The GS in Perspective

With the release of the GS, the Apple Computer product line looks like this, ranging from least powerful and expensive to most powerful and expensive: Apple IIc, Apple IIe, Apple IIGS, Macintosh 512, and Macintosh Plus. According to Apple's New Product Manager Randy Battat, the GS represents the high end of the II family, but doesn't change the positioning of the IIc and IIe (although Apple says we can expect price cuts). "The GS is a new II. It doesn't replace anything," says Apple's Battat.

Apple had four objectives in designing the IIGS, says Battat:

- It had to be an Apple II and run existing II software.
- It had to be faster.
- It needed increased memory addressing.
- It needed sophisticated graphics and sound capability.

In many ways the GS offers the best of both worlds. It combines the Macintosh's user interface and sophistication with the Apple II's software base and open architecture. But the GS isn't a merger of the Macintosh and the II. The Mac and II will each retain a "unique identity," according to Battat.

"In terms of power and capability, there's some overlap with the Mac. Is the market going to be confused? I don't think so," says Apple's Vice President of Product Development Jean-Louis Gassée.

What makes an Apple II unique, Battat says, is its "special base" of thousands of software packages and the company's ten years of experience in designing Apple II computers. Battat says this experience let Apple build a II that's comparable to the Mac for less money.

If you were expecting to buy the new GS at a price that rivals the Atari 520 ST or one of the popular IBM clones, you'll be disappointed.

When *inCider* editors viewed the Apple IIGS in June, Apple officials were reluctant to talk pricing. They did indicate, however, that the cost would be in the \$1300 range. Add an RGB monitor and a disk drive, and the price for a complete system is about \$2000. "It's an expen-

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SUPRTERM									
WIZARD 80									
VISION 80	✓	✓							
OMNIVISION									
VIEWMAX 80	✓	✓							
SMARTERM	✓	✓							
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One look at the chart will give you some of the reasons there's only one smart choice in 80-column cards for your Apple. But the real secret to Viewmaster 80's success is something even better: Total compatibility.

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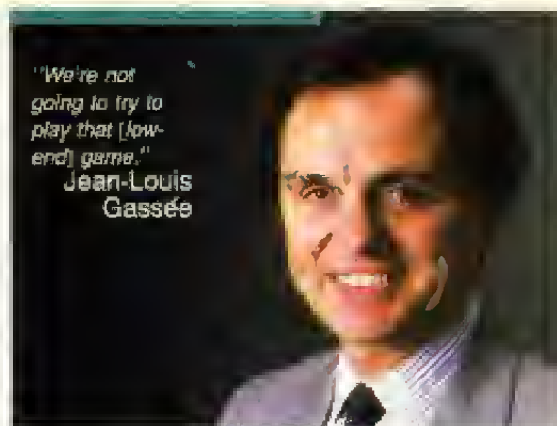
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"We're not going to try to play that [low-end] game."
Jean-Louis Gassée

Photos courtesy of Apple Computer, Inc.

sive product to build. When you try to build two software bases under the same roof, there is no way we can make it as low as the Apple II is today. We're not going to try to play that [low-end] game," Gassée says.

"I don't expect the economy-oriented customer to be necessarily wanting this [product]," he adds.

"Apple IIe users who want to upgrade to the IIGs can retrofit their systems for \$300-\$400 less than the price of the IIGs," Tom Virden, Apple's IIGs introduction marketing manager told *inCider*.

The GS Goes to School

While price is important to everyone, educators are particularly sensitive to the bottom line. Betsy Pace, Apple's marketing manager for K-12 education, says Apple is aware of this. The IIGs will replace the IIe at the top of the K-12 price scale, but, Pace says, the price structure of the various educational packages shouldn't change radically.

"The GS is the home-education connection," explains Pace. She says she doesn't see a parent buying a IIGs just for home education, but if a child uses an Apple II at school and the parents want a powerful computer for home business or productivity, the GS is a likely candidate.

In developing the IIGs, Pace says, Apple recognized the value of Apple II's already in schools and the investment those schools have made in Apple II products. "The progress of the Apple IIGs doesn't leave the older computers behind," Pace says. Because educators don't have a lot of money to spend on computers and software, it's important that what they already have doesn't become obsolete.

The GS will naturally replace the IIe at the high end of the K-12 price scale. Pace says she believes educators will continue to buy IIe's, however, because they know they have the option of upgrading to the GS. The IIe will continue to be the computer Apple recommends for use in kindergarten through grade 8. The GS will be used in grades K-8 for higher-level applications, though—for example, reading programs that take advantage of the GS' sound and graphics capability.

The GS' power and speed (and software that takes advantage of them) make it the Apple best suited for the high-school classroom, according to Pace.

For teachers, Pace says, Apple recommends the IIGs because of its strength as "a productivity workstation." It will let teachers run the instructional programs they use in the classroom as well as their own classroom-management software. Another important aspect of the GS for teachers is its ability to talk to other computers on the AppleTalk local-area network.

The GS is compatible with AppleTalk through its RS-422 interface. Apple expects the GS to play a pivotal role in

"The GS is the home-education connection."
Betsy Pace



the educational network. According to Virden, "The GS is the network master."

The network capabilities of the GS and its ability to run 16-bit business software make the new II the primary machine for school administrators, according to Pace. The Macintosh is reserved for district-level administrators, who need sophisticated business programs and data communications. The Macintosh will also be used for niche applications in grades 9-12 (for example, desktop publishing), she says.

Pace says the option of retrofitting the IIe (replacing the IIe's motherboard with the IIgs motherboard) will eliminate educators' fear of obsolescence. Educators can expect the prices of the IIe and IIc to drop as the GS enters the scene. At press time, though, Pace said a figure for the GS hadn't been set, but she did note it would be "aggressively priced."

On the Home Front

GS should strengthen Apple's solid foothold in the educational market. Outside school, however, the market positioning of the GS isn't as clear-cut.

Apple's game plan is to market the IIgs as it has marketed the IIc and IIe, relying on dealer sales and avoiding at all costs the low end of the market (as well as low prices). Apple's Virden calls the IIe and IIc high-end consumer products, and the IIgs the high end of the II line.

According to Virden, Apple will not market the GS directly against low-priced mass-merchandized computers, such as those from Atari and Commodore. "We are aware of competition," says Virden, but he makes it clear Apple has no intention of getting into a price war. "You know damned well that we're not going to match the Atari 520," he adds.

Instead, he explains, Apple will rely on its strength: "We are committed to our dealers." In launching the GS, Virden says, Apple has focused on "how can it work best for the dealers." He notes, "We also want to build a grass roots movement [by] talking to user groups."

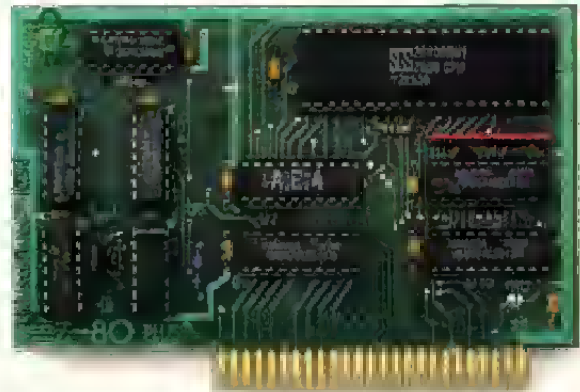
According to Ellen Petry Leanse, Apple's user-group evangelist, user groups will be involved with the IIgs at the product roll-out phase through a cooperative effort with dealers.

Representatives from about 500 user groups will receive modified presentations by dealers. "We want to reach out to end users and make them more comfortable with the machine," Leanse says. As "unbiased third parties," she adds, the involvement of user groups will benefit the dealer and the end user.

Moving Toward the Fringes

According to Virden, the GS will attract users who were on the fringes of deciding which computer to buy: "A lot

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"The last thing people want is Apple flip-flopping on position again."
Tom Virden



of business users with IIc's have accelerator cards and upgrades. They're right on the ragged edge." They're considering going to MS-DOS and 16 bits, but they don't want to give up their Apple II software, according to Virden.

The existence of a computer that runs current Apple II software and offers sophisticated sound and graphics and powerful 16-bit software—a computer that seems to combine the best features of the IIc and the Macintosh—may confuse users trying to decide on a machine. Virden maintains that the Mac 512K and Mac Plus will still be the high-end Apple business systems. "The last thing people want is Apple flip-flopping on position again," Virden says, alluding to Apple's previous positioning of the Apple III, Lisa, and Mac as top-of-the-line systems.

But if the customer's toughest decision is which Apple computer to buy, Apple isn't worried. Gassée says there's a philosophical difference between the II and the Mac.

Users who want to "lift the hood" and get inside the computer will be more likely to look at a IIgs; others will want only the easier-to-use Mac. "There are people who would not touch an Apple II, and there are people who would not touch a Mac," Gassée says.

New Life for the II

While a number of Apple officials are planning the marketing and positioning of the IIgs, Gassée prefers to talk about the computer itself: "I'd rather talk about usages than markets and niches."

The Apple IIgs is "the reincarnation of the Apple II spirit," says Apple's Gassée. "There's so much users can do [with the GS]." It has more power and sophistication than earlier II's, but for those so inclined, the hood still lifts easily.

"It's better than compatible, because it's faster," Gassée says. He warns, however, that "100-percent compatibility is not something you want to guarantee."

Gassée realizes that the best-laid marketing plans often go astray. He jokes about his "Zen theory of marketing": Put the computer out there and see who buys it.

When Gassée refers to his "Zen theory," though, he's only half kidding. While Apple has carefully positioned the GS in the educational and high-end home markets, Gassée hints at the IIgs' greater potential: "We should not try to artificially constrain this product by positioning it as an educational computer or a home computer. . . . It could be an interesting small-business type of machine. My idea of positioning tends to be simplistic: It's the high-end-technology Apple II." ■